

EXHIBIT 4

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.,)
 Plaintiff,)
vs.) No. CV 10-03561 WHA
GOOGLE, INC.,) VOLUME I
 Defendant.)

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Videotaped Deposition of ROBERT VANDETTE,
taken at 42 Chauncy Street, Boston,
Massachusetts, commencing at 10:02 a.m.,
Wednesday, September 7, 2011, before
Jill Shepherd, RPR, MA-CSR No. 148608,
NH-CSR No. 128, CA-CSR No. 13275, CLR,
and Notary Public.

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1 case, and I will generally refer to it as 12:05:43	1 Q. Do you understand that there are 12:09:10
2 the "'104 patent." 12:05:47	2 different -- many different claims in the 12:09:22
3 A. Okay. 12:05:50	3 back of this patent that are being asserted 12:09:23
4 Q. Have you seen this patent before? 12:05:50	4 in this case? 12:09:25
5 A. Yes. I have seen this patent. 12:05:52	5 MS. AGRAWAL: Objection. Form. 12:09:26
6 Q. When? 12:05:54	6 A. I don't have that level of detail. I was -- 12:09:28
7 A. When I was asked to assist in the 12:05:56	7 as I mentioned, I came in April/May. The 12:09:35
8 measurements that are documented in my 12:06:03	8 discussions and the claims were developed 12:09:38
9 report. 12:06:08	9 prior to that. 12:09:41
10 Q. And you indicated, was that April/May time? 12:06:08	10 Q. So your only knowledge of what Android 12:09:46
11 A. Yeah, spring. 12:06:17	11 functionality should be disabled for your 12:09:49
12 Q. Did you review the '104 patent? 12:06:19	12 tests is based on what you were told by 12:09:54
13 A. I did read it. 12:06:22	13 Peter Kessler and Professor Mitchell; is 12:09:57
14 Q. Do you believe you understand it? 12:06:23	14 that correct? 12:10:01
15 MS. AGRAWAL: Objection. Form. 12:06:34	15 MS. AGRAWAL: Objection. Form. 12:10:01
16 A. I'm not a patent attorney, so I relied on 12:06:34	16 A. We came to the conclusion of what to disable 12:10:05
17 Dr. Mitchell to interpret it. 12:06:45	17 during these discussions with them. I'm not 12:10:20
18 Q. Have you reviewed the asserted claims of the 12:06:47	18 sure if I -- 12:10:25
19 '104 patent? 12:06:54	19 Q. You personally did not have knowledge 12:10:27
20 MS. AGRAWAL: Objection. Form. 12:06:54	20 necessary to determine what functionality 12:10:29
21 A. As I have already mentioned, I did see an 12:06:57	21 should be disabled? 12:10:32
22 early draft of the asserted claims around 12:07:01	22 MS. AGRAWAL: Objection. Form. 12:10:33
23 the same April/May time frame. 12:07:05	23 A. I am not a patent attorney, so I did not 12:10:35
24 Q. Do you know which claims are currently being 12:07:09	24 have the skill to interpret patent law. 12:10:42
25 asserted from this patent? 12:07:12	25 Q. Is Professor Mitchell or Peter Kessler a 12:10:46
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1 MS. AGRAWAL: Objection. Form. 12:07:14	1 patent attorney? 12:10:49
2 A. I have kind of a high level understanding of 12:07:19	2 MS. AGRAWAL: Objection. Form. 12:10:49
3 what the claims are asserting. 12:07:47	3 A. My assumption is that they worked with 12:10:51
4 Q. In paragraph 26 of your report, on 12:07:50	4 patent attorneys outside of the discussions 12:10:58
5 page eight, you say, and I quote, "I ran 12:08:04	5 with me. 12:11:02
6 experiments to disable the Android 12:08:09	6 Q. Do you understand that different claims in 12:11:04
7 functionality that Oracle accuses of 12:08:11	7 the '104 patent might accuse slightly 12:11:10
8 infringing the '104 patent"; is that 12:08:15	8 different -- might be asserted against 12:11:14
9 correct? 12:08:18	9 slightly different functionality and they 12:11:17
10 A. Which page are you on? 26? 12:08:18	10 are not identical? 12:11:19
11 Q. Paragraph 126. 12:08:20	11 MS. AGRAWAL: Objection. Form. 12:11:22
12 A. Oh, 126. 12:08:22	12 A. You have to be more specific. I don't -- 12:11:22
13 Q. 26. 12:08:24	13 it's too general a question. 12:11:34
14 A. What page are you on? 12:08:25	14 Q. Were you asked to disable functionality 12:11:42
15 Q. Page eight. 12:08:28	15 corresponding to any particular claim of the 12:11:45
16 A. Page eight. That's what I missed. Yes. 12:08:29	16 '104 patent? 12:11:50
17 Q. How do you know what functionality was 12:08:36	17 MS. AGRAWAL: Objection. Form. 12:11:51
18 accused? 12:08:38	18 A. It was explained to me that I needed to 12:11:53
19 MS. AGRAWAL: Objection. Form. 12:08:40	19 disable the SideTable class resolution of 12:12:09
20 A. I had conversations with Dr. Mitchell where 12:08:41	20 methods, classes, and fields, and that the 12:12:16
21 he explained the infringing areas, and also 12:08:49	21 quickening of byte codes also needed to be 12:12:22
22 had discussions with Mr. Peter Kessler, and 12:08:56	22 disabled -- 12:12:24
23 through these discussions, we came up with 12:09:03	23 Q. You don't -- 12:12:29
24 modifications to the Android sources that 12:09:06	24 A. -- but I don't know exactly which claim in 12:12:30
25 could disable this functionality. 12:09:08	25 the patent corresponds to that 12:12:32
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1	functionality.	12:12:37	1	A. I can't quantify that.	12:15:57
2	Q. In paragraph 40 to 41, on page ten of your	12:12:38	2	Q. Are there less than 100 improvements?	12:15:58
3	report, is there a significant difference in	12:13:04	3	MS. AGRAWAL: Same objection.	12:16:02
4	performance between the original Froyo	12:13:13	4	A. There's actually no way -- I have not been	12:16:04
5	Android code and your modified code with	12:13:15	5	involved in every Java VM and library	12:16:16
6	side tables, but no quickening instructions?	12:13:18	6	improvement that has gone on. There's no	12:16:19
7	MS. AGRAWAL: Objection. Form.	12:13:21	7	way for me to even come up with a number.	12:16:22
8	A. So as you can see from the chart below,	12:13:22	8	Q. How many people have been involved in this	12:16:25
9	there's not much of an impact. There is	12:13:31	9	task?	12:16:30
10	some impact.	12:13:35	10	MS. AGRAWAL: Objection. Form.	12:16:30
11	Q. Would you say that impact is significant?	12:13:38	11	A. Any number I give you would just be a guess.	12:16:31
12	MS. AGRAWAL: Objection. Form.	12:13:41	12	Q. That's fine.	12:16:57
13	A. If you look at the spreadsheet with the data	12:13:43	13	MS. AGRAWAL: Objection. Form.	12:16:58
14	and look at the standard deviation, it is	12:13:50	14	A. And so the fact that I have to tell the	12:17:00
15	statistically significant.	12:13:54	15	truth here, I'm not going to guess.	12:17:07
16	Q. In your professional opinion, regarding the	12:13:57	16	Q. On page four of your report in paragraph 14,	12:17:08
17	performance of the Dalvick Virtual Machine,	12:14:02	17	you say, "The engineering team at Oracle	12:17:22
18	do you believe this change in performance is	12:14:10	18	continues to invest heavily in R&D targeted	12:17:25
19	significant?	12:14:12	19	at increasing performance. A large portion	12:17:28
20	MS. AGRAWAL: Objection. Form.	12:14:13	20	of our virtual machine engineering team is	12:17:30
21	A. As I stated at the beginning of my report,	12:14:14	21	typically dedicated to performance	12:17:34
22	at Oracle and other companies, we spend a	12:14:24	22	improvement projects."	12:17:34
23	lot of engineering effort to get even small	12:14:26	23	And then you go on to give some	12:17:35
24	incremental performance improvements. So,	12:14:30	24	examples; is that correct?	12:17:38
25	yes, I do believe it's significant in that	12:14:36	25	A. Yes.	12:17:39
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1	regard.	12:14:38	1	Q. And you said that this has been going on	12:17:39
2	Q. How much time has Oracle and Sun before that	12:14:40	2	since the beginning of Java development?	12:17:43
3	spent making incremental improvements to	12:14:58	3	A. Correct.	12:17:45
4	Java Virtual Machine?	12:15:03	4	MS. AGRAWAL: Objection. Form.	12:17:45
5	MS. AGRAWAL: Objection. Form.	12:15:05	5	Q. Java was released in somewhere in '94, '95;	12:17:46
6	A. There's no way to quantify that. It's been	12:15:07	6	is that correct?	12:17:52
7	going on since the beginning of Java.	12:15:12	7	MS. AGRAWAL: Objection. Form.	12:17:52
8	Q. How many incremental improvements are there?	12:15:14	8	A. I would have to refer back to some files to	12:18:01
9	MS. AGRAWAL: Objection. Form.	12:15:17	9	know the exact date of Java. It was	12:18:04
10	A. We could produce, you know, a chart of	12:15:20	10	probably the early '90s, but the exact date	12:18:07
11	SPECjbb improvements since the beginning of	12:15:23	11	I don't know. This paragraph is talking	12:18:10
12	time, but every release has increased.	12:15:25	12	only about the virtual machine performance	12:18:11
13	Q. So there's been an ongoing chain of	12:15:30	13	improvements. There are other teams working	12:18:13
14	improvements?	12:15:37	14	in other areas of Java.	12:18:15
15	A. Right.	12:15:37	15	Q. Okay.	12:18:17
16	Q. Going back over ten to 15 years --	12:15:37	16	Would it be wrong to make the	12:18:26
17	MS. AGRAWAL: Objection.	12:15:40	17	assumption that there are probably thousands	12:18:28
18	Q. -- at least?	12:15:41	18	of incremental improvements that have been	12:18:30
19	MS. AGRAWAL: Form.	12:15:42	19	going on since the mid '90s with respect to	12:18:33
20	A. There's -- yes. There's been ongoing	12:15:44	20	the Java Virtual Machine?	12:18:36
21	performance improvements since Java first	12:15:47	21	MS. AGRAWAL: Objection. Form.	12:18:38
22	came out.	12:15:50	22	A. You are asking me to guess, and I can't	12:18:40
23	Q. How many improvements would there be? Ten?	12:15:50	23	guess.	12:18:44
24	50? 100?	12:15:53	24	Q. You don't know?	12:18:51
25	MS. AGRAWAL: Objection. Form.	12:15:55	25	MS. AGRAWAL: Objection. Form.	12:18:52
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<p>1 Q. I'm not asking you for a specific number. 12:18:58</p> <p>2 Give me a general ballpark figure. 12:19:01</p> <p>3 MS. AGRAWAL: Objection. Form. 12:19:03</p> <p>4 A. You are asking me to describe changes or 12:19:04</p> <p>5 incremental performance improvements in 12:19:11</p> <p>6 groups that I really wasn't involved in. 12:19:14</p> <p>7 Q. Turning to page eight, paragraph 28 of your 12:19:47</p> <p>8 report, you discuss the modifications that 12:19:50</p> <p>9 you made to conduct your experiments; is 12:20:00</p> <p>10 that correct? 12:20:03</p> <p>11 A. Yes. 12:20:03</p> <p>12 Q. And you created these modifications based on 12:20:03</p> <p>13 what you were told by Professor Mitchell and 12:20:14</p> <p>14 Peter Kessler; is that correct? 12:20:18</p> <p>15 MS. AGRAWAL: Objection. Form. 12:20:19</p> <p>16 A. Yes. We discussed the functionality, and 12:20:20</p> <p>17 Peter I both looked through the sources to 12:20:27</p> <p>18 try to find out how to properly disable this 12:20:31</p> <p>19 functionality, and we came to a consensus. 12:20:33</p> <p>20 Q. It appears that you attempted two out of 12:20:42</p> <p>21 three possible scenarios here? 12:20:46</p> <p>22 A. That's correct. 12:20:49</p> <p>23 MS. AGRAWAL: Sorry, objection. 12:20:49</p> <p>24 Form. 12:20:51</p> <p>25 Q. The first scenario in paragraph 28 is 12:20:53</p> <p style="text-align: right;">Page 82</p>	<p>1 A. It would impact the results potentially, 12:22:15</p> <p>2 since I'd be adding additional functionality 12:22:18</p> <p>3 to Dalvick that it doesn't currently have. 12:22:20</p> <p>4 Q. It would, however, be technically possible 12:22:24</p> <p>5 for someone to do so? 12:22:26</p> <p>6 MS. AGRAWAL: Objection. Form. 12:22:34</p> <p>7 A. Let's see. It may be technically possible 12:22:34</p> <p>8 to build a system that does quickening 12:22:57</p> <p>9 without side tables, but it would involve 12:23:01</p> <p>10 adding additional overhead that Dalvick 12:23:03</p> <p>11 doesn't currently have. 12:23:08</p> <p>12 Q. In paragraph 36, you state that you did not 12:23:10</p> <p>13 try running the trace compiler; is that 12:23:19</p> <p>14 correct? 12:23:23</p> <p>15 A. Oh, paragraph -- sorry. That is correct, 12:23:23</p> <p>16 for the same reason that we didn't do the 12:23:35</p> <p>17 quickening alone. 12:23:37</p> <p>18 Q. What is the trace compiler? 12:23:38</p> <p>19 MS. AGRAWAL: Objection. Form. 12:23:42</p> <p>20 A. That is Dalvick's implementation of a JIT. 12:23:43</p> <p>21 Q. Are you saying that for your performance 12:23:51</p> <p>22 benchmark regarding the '104 patent you had 12:24:01</p> <p>23 to disable the JIT? 12:24:04</p> <p>24 MS. AGRAWAL: Form. 12:24:06</p> <p>25 A. That's correct. 12:24:07</p> <p style="text-align: right;">Page 84</p>
<p>1 building side tables, but not quickening 12:20:58</p> <p>2 instructions, and the second scenario is not 12:20:59</p> <p>3 building side tables or quickening 12:21:03</p> <p>4 instructions; is that correct? 12:21:06</p> <p>5 A. That's correct. 12:21:08</p> <p>6 Q. Is there a third possibility of not building 12:21:10</p> <p>7 side tables, but building quickening 12:21:16</p> <p>8 instructions? 12:21:20</p> <p>9 MS. AGRAWAL: Objection. Form. 12:21:22</p> <p>10 A. The quickening was dependent upon the side 12:21:22</p> <p>11 table for its implementation in order to 12:21:27</p> <p>12 avoid, you know, any possible error in the 12:21:30</p> <p>13 results. We did not want to substantially 12:21:37</p> <p>14 modify Dalvick in order to try to attempt 12:21:39</p> <p>15 that. We wanted to restrict our changes to 12:21:43</p> <p>16 just simple commenting out of code that 12:21:47</p> <p>17 would provide the before and after. 12:21:48</p> <p>18 Q. So if it got too complicated, you did not 12:21:51</p> <p>19 attempt it? 12:21:55</p> <p>20 MS. AGRAWAL: Objection. Form. 12:21:55</p> <p>21 A. It's not an issue of complication. It's an 12:21:56</p> <p>22 issue of possibly altering the Dalvick to 12:22:00</p> <p>23 the point where I wouldn't be measuring what 12:22:10</p> <p>24 I wanted to measure. 12:22:12</p> <p>25 Q. It would be -- 12:22:13</p> <p style="text-align: right;">Page 83</p>	<p>1 Q. Do you understand that the JIT is not part 12:24:08</p> <p>2 of the accused functionality of the '104 12:24:13</p> <p>3 patent? 12:24:18</p> <p>4 MS. AGRAWAL: Objection. Form. 12:24:18</p> <p>5 A. I'm not certain that it isn't somehow 12:24:19</p> <p>6 involved in some of the claims, but we 12:24:40</p> <p>7 focused on turning off the functionality in 12:24:46</p> <p>8 a mode that was possible. 12:24:49</p> <p>9 Q. If, in fact, JIT is not part of the accused 12:24:54</p> <p>10 functionality, then wouldn't disabling it 12:25:08</p> <p>11 affect the performance of this benchmark? 12:25:16</p> <p>12 MS. AGRAWAL: Objection. Form. 12:25:20</p> <p>13 A. I do believe that the numbers would be 12:25:21</p> <p>14 slightly different; however, the overhead of 12:25:28</p> <p>15 having to re-resolve all of the classes, 12:25:34</p> <p>16 fields, and methods is a fixed overhead that 12:25:38</p> <p>17 the JIT could not compensate for. So I 12:25:42</p> <p>18 believe the performance reduction or 12:25:47</p> <p>19 degradation would still be substantial. 12:25:52</p> <p>20 Q. Despite fixed overhead, you are referring to 12:26:03</p> <p>21 other aspects of the benchmarking programs 12:26:08</p> <p>22 might execute faster if the JIT was enabled; 12:26:10</p> <p>23 is that correct? 12:26:14</p> <p>24 MS. AGRAWAL: Objection. Form. 12:26:15</p> <p>25 A. They would be severely diminished by the 12:26:16</p> <p style="text-align: right;">Page 85</p>

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<p>1 I declare under penalty of perjury 2 under the laws that the foregoing is 3 true and correct. 4 5 Executed on _____, 20____, 6 at _____, _____. 7 8 9 10 11 _____ 12 ROBERT VANDETTE 13 14 15 16 17 18 19 20 21 22 23 24 25</p> <p style="text-align: right;">Page 122</p>	<p>1 INDEX 2 WITNESS PAGE 3 ROBERT VANDETTE 4 Examination by Mr. Francis 5 6 EXHIBITS 7 NO. DESCRIPTION PAGE 8 Exhibit 460 Defendant's Notice of 8 9 Rule 30(B)(1) Deposition of 10 Robert ("Bob") G. Vandette 11 Exhibit 461 Summary and Report of 10 12 Robert ("Bob") Vandette 13 Exhibit 462 Presentation 41 14 (A JIT Compiler 15 for Dalvik VM) 16 Exhibit 463 Dhrystone White Paper 58 17 Exhibit 464 OAGOOGL0014151624 - 63 18 OAGOOGL0014151630 19 Exhibit 465 OAGOOGL0011198304 - 66 20 OAGOOGL0011198305 21 Exhibit 466 US Patent No. RE 38,104 73 22 Exhibit 467 US Patent No. 6,910,205 91 23 Exhibit 468 OAGOOGL0014151618 - 113 24 OAGOOGL0014151623 25 Exhibit 469 OAGOOGL0019108076 - 114 OAGOOGL0019108077 Exhibit 470 OAGOOGL0023688735 - 115 OAGOOGL0023688745 Exhibit 471 OAGOOGL0024644910 118</p> <p style="text-align: right;">Page 124</p>
<p>1 CERTIFICATE 2 3 COMMONWEALTH OF MASSACHUSETTS 4 MIDDLESEX, SS. 5 6 I, Jill Shepherd, Notary Public, in 7 and for the Commonwealth of Massachusetts, 8 do hereby certify that: 9 ROBERT VANDETTE, the witness whose 10 deposition taken on September 7, 2011 is 11 hereinbefore set forth, was satisfactorily 12 identified by means of driver's license, and 13 was duly sworn by me, and that the foregoing 14 transcript is a true and accurate record of 15 the testimony given by such witness and such 16 testimony is a true and accurate 17 transcription of my stenotype notes to the 18 best of my knowledge, skill, and ability. 19 I further certify that I am not 20 related to any of the parties in this matter 21 by blood or marriage and that I am in no way 22 interested in the outcome of this matter. 23 IN WITNESS WHEREOF, I have hereunto 24 set my hand and notarial seal this 8th day 25 of September, 2011.</p> <p>23 _____ 24 Jill Shepherd, RPR 25 Notary Public My Commission expires: April 18, 2014</p> <p style="text-align: right;">Page 123</p>	

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